exocrine part of the pancreas. Revealed lower optical density of cytoplasm in insulin+ cells in liver and exocrine part of the pancreas, compared to β-cells, indicates relatively low content of insulin in these cells and shows its lower functional activity.

Conclusion. In T2D deficiency of insulin can be compensated for by the formation of new cells, producing insulin. Reprogramming of hepatocytes and cells of exocrine part of the pancreas into insulin+ cells is a potentially approach to generate new insulin-producing cells. An increase both the number of insulin+ hepatocytes and quantity in them of a transcription factor PDX1, which regulates expression of insulin gene, is a perspective way in in the development of new methods and approaches in the treatment of diabetes mellitus.

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ISOFLAVONES AS CANCER SENOTHERAPEUTICS: A FUTURE VISION

Keywords: Isoflavones, Cancer senescence, Senolysis.

Isoflavones are a type of polyphenol found in soybeans, chickpeas, fava beans, pistachios, peanuts, nuts, and other fruits [1]. Isoflavones include daidzin, genistin, biochanin A, and formononetin [2]. Isoflavones can inhibit growth of breast, uterine, and prostatic cancers [3–5].

Cancer is a leading cause of morbidity and mortality worldwide. Deaths from cancer worldwide are projected to reach over 13 million in 2030 [6]. Chemotherapy is a type of cancer treatment that uses one or more chemotherapeutic agents [7]. Doxorubicin, an anthracycline antibiotic is among the most widely used anticancer agents for treatment of various cancer types [8]. Doxorubicin interacts with the DNA by intercalation thus, inhibiting macromolecular biosynthesis. This further inhibits the progression of the enzyme topoisomerase II, and relaxes supercoils in DNA for transcription and thereby inducing cell cycle arrest [9]. Moreover, doxorubicin treatment is associated with senescent markers in different cancer types such as upregulation of P-p53 (Ser15) and p21 expression along with increased cell positive cells bearing senescence associated- β-galactosidase (SA β-gal) activity and cell cycle arrest [10, 11].

Elimination of senescent cancer cells is an important objective in doxorubicin therapy because it my replace if not swiped. To date, our previous *in vitro* study stated the senolytic effect of thymoquinone (ingredient of *Nigella sativa* seeds), curcumin (ingredient of *Curcuma longa* seeds), and caffeine (ingredient of coffee bean seeds) against senescent, induced by doxorubicin, colon (HCT116) and breast (MCF7) cancer cell lines [10]. Also, we recognized the senolytic effect of costulonide (ingredient of *Costus speciosus*) against senescent HCT116 and MCF7 cancer cell lines (in press). Therefore, we seek to investigate the senolytic effects of isoflavones to eliminate the senescent cells that mediated by doxorubicin. Also, if able to protect the normal body cells against the side effects of doxorubicin (figure 1).

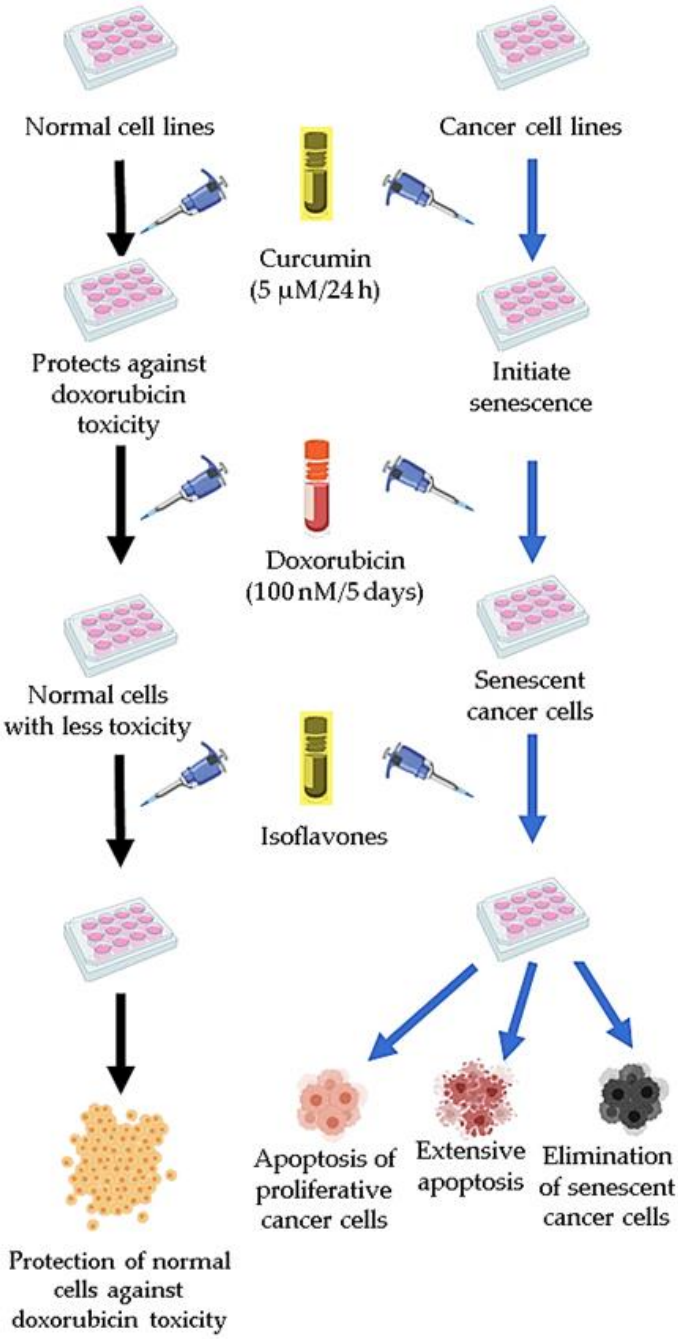

Figure 1. Proposal idea

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STRUCTURAL BASIS FOR THE DESIGN OF KINASE INHIBITORS IN CANCER CHEMOTHERAPY AND NEURODEGENERATIVE DISEASES, ESPECIALLY OF THE CK1 KINASE FAMILY

Key words: kinases, cancer chemotherapy, neurodegenerative diseases CK1 kinase family.

Structural basis for the design of kinase inhibitors in cancer chemotherapy and neurodegenerative diseases will be presented and discussed. The main accent will be done on study of CK1 kinase family.

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RESEARCH TRENDS IN FOOD BIOTECHNOLOGY AT URAL FEDERAL UNIVERSITY*

Keywords: food biotechnology, biotransformation, food wastes, plant materials, biologically active substances.